



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/476,615	12/31/1999	MICHAEL S. CRONE	GE-W-192-CIP	8072

7590 09/23/2003

Duane Morris LLP  
1667 K Street N.W.  
Suite 700  
Washington, DC 20006

EXAMINER

BOYCE, ANDRE D

ART UNIT

PAPER NUMBER

3623

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

SK

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/476,615	CRONE, MICHAEL S.	
Examiner	Andre Boyce	Art Unit	3623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 11 July 2003.

2a) This action is **FINAL**.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-19 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. This Non-Final Office action is in response to Applicant's response filed July 11, 2003. Claims 1-19 are pending.

***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-19 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The basis of this rejection is set forth in a two-prong test of:

- (1) whether the invention is within the technological arts; and
- (2) whether the invention produces a useful, concrete, and tangible result.

For a claimed invention to be statutory, the claimed invention must be within the technological arts. Mere ideas in the abstract (i.e., abstract idea, law of nature, natural phenomena) that do not apply, involve, use, or advance the technological arts fail to promote the "progress of science and the useful arts" (i.e., the physical sciences as opposed to social sciences, for example) and therefore are found to be non-statutory subject matter. For a process claim to pass muster, the recited process must somehow apply, involve, use, or advance the technological arts. In the present case the independent claims 1, 8, 13, and 17-19 only recite abstract

ideas. The recited steps of establishing plural criteria for acceptance of a solution; classifying the scheduling problem; selecting the criteria for acceptance of a solution as a function of the classification of the scheduling problem; emphasizing cost over resource exception for a predetermined initial period of the search phase; making a random move, weighting the resource exception and cost factors associated with the random move; evaluating the resource exception and the cost of the solution against a predetermined criteria; and accepting or rejecting the move based on the evaluation, etc. does not involve, use, or advance the technological arts (**e.g., processor, computer, electronic computing device**), since the steps could be performed using pencil and paper.

Additionally, for a claimed invention to be statutory, the claimed invention must produce a useful, concrete, and tangible result. In the present case the claimed invention selects the criteria for acceptance of a solution, etc., thereby producing a useful, concrete, and tangible result, but not within the technological arts as explained above.

#### ***Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, 6, 7, 13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matheson et al (USPN 5,623,413), in view of Fabre et al (USPN 6,405,186).

As per claim 1, Matheson et al disclose in a multiple move, simulated annealing method for resolving a scheduling problem associated with a plurality of orders for train resources, each order having a cost function and a scheduling window associated therewith (see column 19, lines 4-8). Matheson et al does not disclose the improvement comprising the steps of: (a) establishing plural criteria for acceptance of a solution; (b) classifying the scheduling problem; and (c) selecting the criteria for acceptance of a solution as a function of the classification of the scheduling problem. Fabre et al discloses simulated annealing, where constructing an initial plan in order to improve the quality of the simulated annealing is done by classifying the request (i.e., problem) with certain criterion, and selecting the opportunities in the order determined by the previously established classification (Applicant's step (c), see column 6, lines 10-20). Both Matheson and Fabre are concerned with optimizing a cost function via the simulated annealing technique, therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include (a) establishing plural criteria for acceptance of a solution; (b) classifying the scheduling problem; and (c) selecting the criteria for acceptance of a solution as a function of the classification of the scheduling problem in Matheson, as seen in Fabre, as a way to improve the quality of the plan obtained

at the end of the process or to improve the speed of convergence on the solution (see Fabre, column 6, lines 5-10), thus making the Matheson system more effective.

As per claim 2, Matheson et al disclose (a) determining the total trip time associated with the plurality of orders (determined by the movement planner, based upon the trajectory of the train, see columns 13, lines 14-16 and 38-46); and (b) determining the total slack time associated with the plurality of orders (see column 26, lines 16-19, where the total time is calculated from slack percentage). Matheson et al does not explicitly disclose (c) determining the classification of the problem as a function of the total trip time and the slack time. Fabre et al discloses classifying requests in accordance with certain criterion (see column 6, lines 11-14). Further, Matheson et al discloses rule-based criteria that incorporate company policy, operating procedures, and experience factors, among others (see column 24, lines 4-6), wherein train operating procedures include total trip time and slack time, associated therein. Both Matheson and Fabre are concerned with optimizing a cost function via the simulated annealing technique, therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include determining the classification of the problem in accordance with certain criterion in Matheson, as seen in Fabre, as a way to improve the quality of the plan obtained at the end of the process or to improve the speed of convergence on the solution (see Fabre, column 6, lines 5-10), thus making the Matheson system more effective.

As per claims 3 and 7, Matheson et al does not explicitly disclose (a) selecting a predetermined percentage of total trip time to provide a threshold value; and (b)

comparing slack time with the threshold value. Fabre et al discloses developing threshold parameters in accordance with the simulated annealing technique (see column 5, lines 46-55), while Matheson et al discloses rule-based criteria that incorporate company policy, operating procedures, and experience factors, among others (see column 24, lines 4-6), wherein train operating procedures include total trip time and slack time, associated therein. Both Matheson and Fabre are concerned with optimizing a cost function via the simulated annealing technique, therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include selecting a predetermined percentage of total trip time to provide a threshold value; and comparing slack time with the threshold value in Matheson, as a way to improve the quality of the plan obtained at the end of the process or to improve the speed of convergence on the solution (see Fabre, column 6, lines 5-10), thus making the Matheson system more effective.

As per claim 6, Matheson et al disclose (a) determining the total trip time associated with the plurality of orders (determined by the movement planner, based upon the trajectory of the train, see columns 13, lines 14-16 and 38-46); and (b) determining the resource exception associated with the plurality of orders (see column 21, lines 10-12). Matheson et al do not explicitly discloses (c) determining the classification of the problem as a function of the total trip time and the resource exception. Fabre et al discloses classifying requests in accordance with certain criterion (see column 6, lines 11-14). Further, Matheson et al discloses rule-based criteria that incorporate company policy, operating procedures, and experience

factors, among others (see column 24, lines 4-6), wherein train operating procedures include resource exception, total trip time and slack time, associated therein. Both Matheson and Fabre are concerned with optimizing a cost function via the simulated annealing technique, therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include determining the classification of the problem in accordance with certain criterion in Matheson, as seen in Fabre, as a way to improve the quality of the plan obtained at the end of the process or to improve the speed of convergence on the solution (see Fabre, column 6, lines 5-10), thus making the Matheson system more effective.

As per claims 13 and 16, Matheson et al disclose a method for resolving a scheduling problem associated with a plurality of orders for train resources by evaluating available moves in a simulated annealing process, each move resulting in a change in the resource exception associated with the problem and a change in cost associated with the move (see column 19, lines 4-8), comprising the steps of: (b) making a random move (see column 19, lines 14-15), (c) weighting the resource exception and cost factors associated with the random move (see column 21, lines 10-13); (d) evaluating the resource exception and the cost of the solution against a predetermined criteria (energy function); and g) accepting or rejecting the move based on the evaluation (see column 19, line 17-20). Matheson et al does not disclose (a) classifying the scheduling problem, a scaling parameter related to the classification of the problem, and the predetermined criteria is the classification of the problem. Fabre et al discloses classifying requests in accordance with certain

criterion (see column 6, lines 11-14), and selecting the opportunities in the order determined by the classification (scaling parameter). Both Matheson and Fabre are concerned with optimizing a cost function via the simulated annealing technique, therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include determining the classification of the problem in accordance with certain criterion in Matheson, as seen in Fabre, as a way to improve the quality of the plan obtained at the end of the process or to improve the speed of convergence on the solution (see Fabre, column 6, lines 5-10), thus making the Matheson system more effective.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matheson et al (USPN 5,623,413), in view of LeSaint et al (WO 9822897).

As per claim 8, Matheson et al disclose in a multiple move, simulated annealing method for resolving a scheduling problem associated with a plurality of orders for train resources having an initial resource exception and a cost associated therewith by evaluating the resource exception and cost associated with each move during a search phase (see column 19, lines 4-8). Matheson et al does not explicitly disclose the step of emphasizing cost over resource exception for a predetermined initial period of the search phase. LeSaint et al disclose an initial schedule in a simulated annealing process that emphasizes cost over task allocation (e.g., resource exception, see page 21, ¶ 8-9). Both Matheson and LeSaint are concerned with effective simulated annealing techniques, therefore it would have been obvious to

one having ordinary skill in the art at the time the invention was made to include emphasizing cost over resource exception for a predetermined initial period of the search phase in Matheson, as seen in LeSaint, thereby giving more emphasis to the element deemed more important in the particular annealing method, thus making the method more flexible.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matheson et al (USPN 5,623,413).

As per claim 18, Matheson et al disclose in a multiple move, simulated annealing method of solving a problem in the scheduling of train resources (see column 19, lines 4-8). Matheson et al does not disclose reducing the level of acceptance of a solution in the evaluations of the results of early moves in order to preserve options for subsequent moves. However, Matheson discloses optimization allowed to take some bad moves early (see column 19, lines 15-18). Further, Matheson discloses re-initializing the search parameters by reducing the number of attempts with no higher energy steps, thereby reducing the level of acceptance of a solution (See column 20, lines 40-47), therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include reducing the level of acceptance of a solution in the evaluations of the results of early moves in order to preserve options for subsequent moves in Matheson, thereby focusing the attention of the annealing method in more critical areas in later stages of the search process (see column 19, lines 24-34), thus making the method more effective.

***Response to Arguments***

8. In the Remarks, with respect to claim 1, Applicant argues that Fabre does not disclose, teach, or suggest (a) establishing plural criteria for acceptance of a solution; (b) classifying the scheduling problem; and (c) selecting the criteria for acceptance of a solution as a function of the classification of the scheduling problem. The Examiner disagrees and submits that Fabre discloses simulated annealing, where constructing an initial plan in order to improve the quality of the simulated annealing is done by classifying the request (i.e., problem) with certain criterion, Applicant's step's (a) and (b), and selecting the opportunities in the order determined by the previously established classification (Applicant's step (c), see column 6, lines 10-20).

With respect to claim 8, Applicant argues that Matheson does not disclose emphasizing cost over resource exception for a predetermined initial period of the search phase. The Examiner submits LeSaint as teaching the limitation as seen above.

With respect to claim 18, Applicant argues that Matheson does not disclose lowering the acceptance level. The Examiner submits that Matheson discloses re-initializing the search parameters by reducing the number of attempts with no higher energy steps, thereby reducing the level of acceptance of a solution, as seen in the above rejection.

***Allowable Subject Matter***

9. Claims 4, 5, 9-12, 14-15, 17, and 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of any base claim and any intervening claims.

***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre Boyce whose telephone number is (703) 305-1867. The examiner can normally be reached on 9:30-6pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on (703) 305-9643. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

  
adb

  
TARIQ R. HAFIZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3600